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THE EFFECT OF COMPUTER READABLE INFORMATION ON STUDENT PERFORMANCE, ACHIEVEMENT AND MOTIVATION

FIRST INTERIM REPORT
FOR
THE MINISTER OF EDUCATION of ONTARIO

- May 1991 -

Location: Mary Ward Catholic Secondary School
2000 McNicoll Avenue,
Scarborough, Ontario
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Board: Metropolitan Separate School Board
80 Sheppard Avenue East
Willowdale, Ontario
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Background

On September 1, 1990 an agreement was made between The Minister of Education of Ontario and the Metropolitan Separate School Board to undertake a project involving the use of optical technology and CD-ROMs in a secondary school setting.

The research is being conducted at Mary Ward which is currently housed in temporary facilities. Mary Ward is a composite, secondary school of approximately one thousand students.
The library resource centre and two computer labs are the three main areas used for the purpose of this study.

Goal

To evaluate the effect of CD-ROM applications on student academic achievement, performance and motivation.

Objectives

- to test the performance of CD-ROM applications on a PC stand-alone, a PC network and an Icon network
- to develop a selection policy regarding the purchase of software
- to establish a North American network of CD-ROM users
- to develop learning materials suitable for teaching applications
- to inservice the entire student body and staff of Mary Ward
- to integrate the learning materials into the curriculum in consultation with department heads
- to evaluate student performance
- to evaluate student achievement
- to compare student achievement using electronic and traditional systems of information retrieval
- to assess student motivation
- to investigate the use of other optical technology
- to develop recommendations regarding the use of optical technology in secondary schools
- to determine staffing needs for the installation of software and maintenance of hardware
- to determine staffing needs for program development

Equipment

Presently there are six Icon II computers in the library-media centre that are networked to another seventy-four workstations in the computer lab and the computer-across-the-curriculum lab. There is one main fileserver and three sub-servers that link the system. In addition a MS-DOS PW300 Unisys computer is being used.

Four Philips CD-ROM 131 players have been purchased and are running off one Icon II server in a daisy chain set up. The stackable CD-ROMs are centralized in the library and the software is available throughout the network. An additional CD-ROM player is attached to the PW300 computer.

Software

A variety of software packages are being tested according to two criteria. Firstly, the software must run on the Icon network or the PW300 and secondly, the content must be appropriate for the curriculum of secondary schools.

The following software is now under review:

- Grolier Electronic Encyclopedia
- Canadian Business and Current Affairs
- The Toronto Star

- SIRS Science
- The Canadian Electronic Encyclopedia
- McGraw-Hill Science and Technology
- Readers Guide to Periodical Literature
- The Readers' Guide Abstracts
- Biography Index
- Book Review Digest
- The Multi-Bible
- The FindIt Webster

School-Based Personnel

Role of researchers

- to review literature pertaining to CD-ROMs
- to attend computer-related conferences
- to initiate contacts with software distributors
- to initiate contacts with hardware manufacturers
- to develop a selection policy in regard to purchasing software
- to establish a network of CD-ROM users
- to master software applications
- to develop learning guides to teach applications
- to consult with department heads to integrate learning guides into the curriculum
- to inservice all students and staff at Mary Ward
- to evaluate student performance and achievement using CD-ROMs
- to develop recommendations regarding the use of CD-ROMs

Role of technologist

- to be knowledgeable about operating systems such as QNX and MS-DOS
- to provide expertise in a QDOS environment
- to install CD-ROM players
- to install software
- to oversee computer hardware and network problems
- to answer queries of students
- to assist teachers in the use of hardware and software

Private Sector Involvement

Unisys Canada Inc., is acting as consultant in respect to the compatibility of the CD-ROM software with Unisys hardware.

Phase One of Project

Objectives

. to test the performance of the software on the network

. to assess the appropriateness of the learning guides

. to gauge teacher reaction to use of the CD-ROM

. to gauge student reaction to the use of the CD-ROM

. to observe the performance of students at different levels

. to compare the performance of students at the same level using different information retrieval methods

Preparation

One compact disc application was selected that encompassed most of the features and functions that are common to many applications. The New Grolier Electronic Encyclopedia was chosen because it can also be used across the curriculum and at different grade levels.

Instructional material was developed for students and staff. It was decided to adopt a LEARNING GUIDE format for student use. The material included in the guide was developed with an awareness of the abilities of the students. The step-by-step approach that walked the student through the application was designed to replace the rather technical and complex manual. In addition, a command template was designed for quick reference.

Pilot Run for Inservicing

Two teachers of grade nine history were selected. Teacher A who is not computer literate has two advanced level classes and teacher B who is computer literate has two general level classes. A common assignment was given to both advanced level classes and another was given to the general level classes. For purpose of comparison, only one class from each group was to use the CD-ROM for the assignment at this time.

A schedule was set up which involved three seventy-minute sessions with each selected class over three consecutive days. The goals of the program were explained to the teachers and they were asked to provide an appropriate history assignment to follow the search examples used in the learning guides.

Workshops were conducted in the networked computer lab and the students worked in pairs. The inservicing began with an introduction to the computer, its input and output devices. Students were given an overview of CD-ROM technology. The inservicing consisted of demonstration followed by hands-on experience. The students were shown how to apply search techniques already learned in the library to a computerized system. Through various search techniques they learned to refine or broaden topics using existing built-in functions such as word searches, browsing titles, browsing word indexes, linking and comparing text. On the

last day of the workshop the students worked on their individual history assignments.

Conclusion

At the end of the three-day inservicing sessions an informal discussion was conducted with the classes involved in the pilot program. For the most part the response was very positive. The students seemed excited about using the technology and expressed interest in using it again.

Teacher A who is not computer literate had no difficulty working through the application. He found the application user-friendly, and also felt that his students enjoyed the sessions. He said that he would not hesitate to bring students back to the lab to work on new assignments using CD-ROMs. He expressed interest in seeing other applications available through the library.

When Teacher A came to evaluate the assignment handed in by both his classes, he found that the class that had used the Electronic Grolier tended to have more precise information on the chosen topic.

Teacher B, who is in charge of the two general level classes, also had a positive reaction to the workshop. He reported that written work was more coherent and more on-topic than the work handed in by the second group.

Phase Two

- inservicing of all students and staff at Mary Ward
- distribution of questionnaires to students and staff
- collection of data
- establishment of a network of CD-ROM users

Phase Three

- continuation of inservicing
- development of further learning materials
- integration of learning materials into the curriculum
- evaluation of student performance, achievement and motivation
- investigation of other optical technology
- submission of formal report